

CLAIMS

Having thus described the aforementioned invention, we claim:

1. An arch support orthosis having an arch curve being adjustably tensioned during use, said arch support brace being fittable proximately under a foot and being sized and shaped to be removably placed within a foot support enclosure worn by a user, comprising:
 - an arch support orthosis being sized for support of the foot from underneath about the metatarsal bones of the foot, to underneath about the calcaneus bone of the foot, said orthosis having a first surface being contoured for support of the foot, having a second surface being downwardly faced for contact with the foot supporting surface of the shoe, and having a medial side and an outer lateral side on opposed sides of a central longitudinal midline of said orthosis;
 - a forefoot portion of said first surface being arcuately shaped to be positionable underneath the metatarsal bones of the foot;
 - a heel portion of said first surface being arcuately shaped to be positionable underneath the calcaneus bone of the foot;
 - a medial longitudinal arch curve proximate said medial side of said orthosis, said medial longitudinal arch curve being shaped to be positionable underneath the arch of the foot, said medial longitudinal arch curve having an upper surface being curved upwardly along a crown portion, said medial side being disposed in a continuous arched curve along a length dimension of said medial side of said orthosis, said medial

longitudinal arch curve including:

an anterior slope being inclined from said upper surface of said medial

longitudinal arch curve toward said forefoot portion of said orthosis;

a posterior slope being inclined from said upper surface of said medial

longitudinal arch curve toward said heel portion of said orthosis;

a medial slope being inclined from said upper surface of said medial

longitudinal arch curve toward said lateral side of said orthosis; and

a means for tensioning said medial longitudinal arch curve connectable between an underside portion of said anterior slope and an underside portion of said posterior slope, said means for tensioning having a means for adjusting manipulated by a user for adjustment of said means for tensioning between a neutral length, a decreased length, and an extended length between said anterior slope and said posterior slope,

whereby when the neutral length of said means for tensioning is reduced to the decreased length by the user adjustment of said means for adjusting, the tension along said medial longitudinal arch curve is increased thereby the stiffness of said arch curve increases from when said means for tensioning is at the neutral length, and each slope of said anterior slope and said posterior slope is increased, and when the neutral length of said means for tensioning is increased to the extended length by the user adjustment of said means for adjusting, the tension along said medial longitudinal arch curve is decreased, and each slope of said anterior slope and said posterior slope is decreased.

1 2. The arch support orthosis of Claim 1 wherein said means for tensioning
2 including:

3 an anterior bracket being L-shaped, said anterior bracket having a distal
4 portion being connected under said anterior slope proximal to said medial side, said
5 anterior bracket having a proximal portion extended downwardly from said anterior
6 slope;

7 a posterior bracket being L-shaped, said posterior bracket having a distal
8 portion being connected under said posterior slope proximal to said medial side, said
9 posterior bracket having a proximal portion extended downwardly from said posterior
10 slope;

11 an anterior linkage aligned with said anterior bracket, said anterior linkage
12 having a distal end pivotably connected with said proximal portion of said anterior
13 bracket, said anterior linkage having a proximal end disposed underneath said crown
14 portion of said medial longitudinal arch curve;

15 a posterior linkage aligned with said posterior bracket, said posterior linkage
16 having a distal end pivotably connected with said proximal portion of said posterior
17 bracket, said posterior linkage having a proximal end disposed underneath said crown
18 portion of said medial longitudinal arch curve; and

19 said means for adjusting the neutral length between said distal end of said

20 anterior linkage and said distal end of said posterior linkage, said means for adjusting
21 having opposed ends being disposed to accept therein respectively said proximal ends of
22 said anterior linkage and said proximal linkage, said means for adjusting being
23 manipulated by the user;

24 whereby said anterior linkage and said posterior linkage are retracted into
25 respective opposed ends of said means for adjusting by manipulation of said means for
26 adjusting, the length between said respective distal ends is shortened, each of said
27 anterior and posterior linkages engage said each respective proximal portions of said
28 anterior bracket and said posterior bracket, thereby each respective anterior and posterior
29 brackets pivot respectively inwardly, thereby pulling said underside of said anterior slope
30 and said posterior slope toward each other and increasing the tension along said medial
31 longitudinal arch curve;

32 whereby when each of said anterior linkage and said posterior linkage is
33 extended from said means for adjusting by manipulation of said means for adjusting, the
34 length between said respective distal ends is lengthened, thereby each distal end extends
35 against said respective proximal portions of said anterior bracket and said posterior
36 bracket which pivot against the underside of said anterior slope and said posterior slope,
37 thereby pushing said underside of said anterior slope and said posterior slope apart and
38 reducing the tension of said medial longitudinal arch curve.

1 3. The arch support orthosis of Claim 1 further comprising said anterior slope
2 having an anterior base of a first thickness, said posterior slope having a posterior base of
3 a second thickness, said crown of said medial slope having a third thickness along said
4 upper surface of said medial longitudinal arch curve, whereby said anterior base and said
5 posterior base providing rigidity for said medial longitudinal arch curve for repetitive
6 adjusting of said means for tensioning without failure during use by heavily weighted
7 users.

1 4. The arch support orthosis of Claim 1 wherein said means for adjusting being
2 repeatably manipulated by the user for repetitive extension and retraction of said anterior
3 linkage and said posterior linkage.

1 5. The arch support orthosis of Claim 1 wherein said means for adjusting
2 including a rotatable adjusting means having a sleeve nut, a worm gear, or a turnbuckle.

1 6. The arch support orthosis of Claim 1 wherein said means for tensioning
2 including:
3 said anterior bracket having a distal portion being connected under said
4 anterior slope proximal to said medial side, said anterior bracket having a proximal
5 portion extended downwardly from said anterior slope;

6 said posterior bracket having a distal portion being connected under said
7 posterior slope proximal to said medial side, said posterior bracket having a proximal
8 portion extended downwardly from said posterior slope;

9 an anterior means for adjusting connectable at an anterior swivel joint to said
10 anterior bracket, and

11 a posterior means for adjusting connectable at a posterior swivel joint to said
12 posterior bracket, said anterior adjusting means and said posterior adjusting means having
13 a length of cable connectable therebetween, said length of cable having at least one
14 swivel portion along said length of cable, each of said anterior means for adjusting and
15 said posterior means for adjusting being rotatably manipulated by the user to retract or
16 extend the length of cable between each respective means for adjusting;

17 whereby when either of said anterior means for adjusting and said posterior
18 means for adjusting is rotatably manipulated, the length of cable is adjustable in length,
19 with resultant increase in tension and angles of said anterior slope and said posterior slope
20 when said length of cable is reduced in length, and with resultant decrease in tension and
21 angles of said anterior slope and said posterior slope when said length of cable is
22 increased in length between said anterior bracket and said posterior bracket connected
23 under said medial longitudinal arch curve.

1 7. The arch support orthosis of Claim 1 wherein said means for tensioning

including:

said anterior bracket having a distal portion being connected under said anterior slope proximal to said medial side, said anterior bracket having a proximal portion extended downwardly from said anterior slope;

said posterior bracket having a distal portion being connected under said posterior slope proximal to said medial side, said posterior bracket having a proximal portion extended downwardly from said posterior slope; and

two straps of non-extendable web materials; each of said straps having a distal end attached to said respective anterior bracket and posterior bracket, each of said straps having a proximal end connectable together by a means for adjusting positioned under said medial longitudinal arch curve.

8. The arch support orthosis of Claim 7 wherein said means for tensioning further including said means for adjusting being manipulated by the user for adjustment of the length between said anterior bracket and said posterior bracket.

9. The arch support orthosis of Claim 8 wherein said means for adjusting including a worm gear, a buckle, or a clamp.

1 10. A foot support orthosis including an arch support brace having an arch curve
2 being variably tensioned during use, the foot support orthosis being fittable underneath
3 the foot and being sized and shaped to be removably placed proximal a foot supporting
4 surface of a foot enclosure worn by a user, comprising:

5 an orthosis being sized for support of the foot from underneath about the
6 metatarsal bones of the foot, to underneath about the calcaneus bone of the foot, said
7 orthosis having a first surface being contoured for support of the foot, having a second
8 surface being downwardly faced for contact with the foot supporting surface of the shoe,
9 and having a medial side and a lateral side on opposed sides of a central longitudinal
10 midline of said orthosis;

11 a forefoot portion of said first surface being arcuately shaped to be
12 positionable underneath the metatarsal bones of the foot;

13 a heel portion of said first surface being arcuately shaped to be positionable
14 underneath the calcaneus bone of the foot;

15 a medial longitudinal arch curve proximate said medial side of said orthosis,
16 said medial longitudinal arch curve being shaped to be positionable underneath the arch
17 of the foot, said medial longitudinal arch curve having an upper surface being curved
18 upwardly along a crown portion, said medial longitudinal arch curve including:

19 an anterior slope being inclined from said upper surface of said medial
20 longitudinal arch curve toward said forefoot portion of said orthosis;

21 a posterior slope being inclined from said upper surface of said medial
22 longitudinal arch curve toward said heel portion of said orthosis; and
23 a medial slope being inclined from said upper surface of said medial
24 longitudinal arch curve toward said lateral side of said orthosis; and
25 said anterior slope having an anterior base of a first thickness, said posterior
26 slope having a posterior base of a second thickness, said crown of said medial slope
27 having a third thickness along said upper surface of said medial longitudinal arch curve,
28 said medial side of said medial longitudinal arch curve being disposed in a continuous
29 arched curve along a length dimension of said medial side;
30 whereby said medial longitudinal arch curve having said anterior base,
31 said crown portion, and said posterior base being tensioned during each foot-strike by
32 force being transferred by the foot of the user from said heel portion and onto said medial
33 longitudinal arch curve of said orthosis, thereby increasing the tension along said medial
34 longitudinal arch curve without significantly decreasing the height of the arch curve, with
35 said crown portion of said medial longitudinal arch curve flexibly rebounded to an
36 unweighted position by force being transferred by the foot of the user from said medial
37 longitudinal arch curve and onto said forefoot portion of said orthosis during each foot-
38 strike by the user while wearing said orthosis.

1 11. The foot support orthosis of Claim 10 further comprising a means for

2 tensioning connectable underneath said arch curve, said means for tensioning including:

3 an anterior bracket being L-shaped, said anterior bracket having a distal
4 portion being connected under said anterior slope proximal to said medial side, said
5 anterior bracket having a proximal portion extended downwardly from said anterior
6 slope;

7 a posterior bracket being L-shaped, said posterior bracket having a distal
8 portion being connected under said posterior slope proximal to said medial side, said
9 posterior bracket having a proximal portion extended downwardly from said posterior
10 slope;

11 an anterior linkage aligned with said anterior bracket, said anterior linkage
12 having a distal end pivotably connected with said proximal portion of said anterior
13 bracket, said anterior linkage having a proximal end disposed underneath said crown
14 portion of said medial longitudinal arch curve;

15 a posterior linkage aligned with said posterior bracket, said posterior linkage
16 having a distal end pivotably connected with said proximal portion of said posterior
17 bracket, said posterior linkage having a proximal end disposed underneath said crown
18 portion of said medial longitudinal arch curve; and

19 a means for adjusting the neutral length between said distal end of said
20 anterior linkage and said distal end of said posterior linkage, said means for adjusting
21 having opposed ends being disposed to accept therein respectively said proximal ends of

said anterior linkage and said proximal linkage, said means for adjusting being manipulated by the user;

whereby said anterior linkage and said posterior linkage are retracted into respective opposed ends of said means for adjusting, the length between said respective distal ends is shortened, each of said anterior and posterior linkages engage said each respective proximal portions of said anterior bracket and said posterior bracket, thereby each respective anterior and posterior brackets pivot respectively inwardly, thereby pulling said underside of said anterior slope and said posterior slope toward each other and increasing the tension along said medial longitudinal arch curve;

whereby when each of said anterior linkage and said posterior linkage is extended from said means for tensioning by manipulation of said means for adjusting, the length between said respective distal ends is lengthened, thereby each distal end extends against said respective proximal portions of said anterior bracket and said posterior bracket which pivot against the underside of said anterior slope and said posterior slope, thereby pushing said underside of said anterior slope and said posterior slope apart and reducing the tension of said medial longitudinal arch curve.

12. The foot support orthosis of Claim 10 further comprising a means for tensioning connectable underneath said arch curve, said means for tensioning including:
an anterior bracket connectable to said anterior base, said anterior bracket

4 having a distal portion being connected under said anterior base proximal to said medial
5 side, said anterior bracket having a proximal portion extended toward said posterior base;

6 a posterior bracket connectable to said posterior base, said posterior bracket
7 having a distal portion being connected under said posterior base proximal to said medial
8 side, said posterior bracket having a proximal portion extended toward said anterior base;

9 an anterior linkage aligned with said anterior bracket, said anterior linkage
10 having a distal end pivotably connected with said proximal portion of said anterior
11 bracket, said anterior linkage having a proximal end disposed underneath said crown
12 portion of said medial longitudinal arch curve;

13 a posterior linkage aligned with said posterior bracket, said posterior linkage
14 having a distal end pivotably connected with said proximal portion of said posterior
15 bracket, said posterior linkage having a proximal end disposed underneath said crown
16 portion of said medial longitudinal arch curve; and

17 a means for adjusting the neutral length between said distal end of said
18 anterior linkage and said distal end of said posterior linkage, said means for adjusting
19 having opposed rod ends being disposed to connect in an anterior swiveling connection to
20 said proximal end of said anterior linkage and in a posterior swiveling connection to said
21 proximal end of said proximal linkage, said means for adjusting being manipulated by the
22 user to retract or extend each of said opposed rod ends;

23 whereby when said opposed rod ends are retracted into respective opposed

24 ends of said means for adjusting, the length is shortened between said respective distal
25 ends of said anterior and posterior linkages, each of said anterior and posterior linkages
26 engage said respective proximal portions of said anterior and posterior brackets, thereby
27 each respective anterior and posterior brackets retract respectively toward said means for
28 adjusting, thereby pulling said underside of said anterior base and said posterior base
29 toward each other and increasing the tension along said medial longitudinal arch curve;

30 whereby when said opposed rod ends are extended into respective opposed
31 ends of said means for adjusting, the length is lengthened between said respective distal
32 ends of said anterior and posterior linkages, each of said anterior and posterior linkages
33 engage said respective proximal portions of said anterior and posterior brackets, thereby
34 each respective anterior and posterior brackets retract respectively away from said means
35 for adjusting, thereby pushing said underside of said anterior base and said posterior base
36 away from each other and reducing the tension of said medial longitudinal arch curve.

1 13. A foot support orthosis including an arch curve being variably tensioned
2 during use, the foot support orthosis being fittable underneath the foot and being sized
3 and shaped to be removably placed proximal a foot supporting surface of a foot enclosure
4 worn by a user, comprising:

5 an orthosis being sized for support of the foot from underneath about the
6 metatarsal bones of the foot, to underneath about the calcaneus bone of the foot, said

7 orthosis having a first surface being contoured for support of the foot, having a second
8 surface being downwardly faced for contact with the foot supporting surface of the shoe,
9 and having a medial side and an outer lateral side on opposed sides of a central
10 lengthwise midline of said orthosis;

11 a forefoot portion of said first surface of said orthosis being arcuately
12 shaped to be positionable underneath the metatarsal bones of the foot;

13 a heel portion of said first surface of said orthosis being arcuately shaped
14 to be positionable underneath the calcaneus bone of the foot;

15 a medial longitudinal arch curve having an upper surface being curved
16 upwardly along a crown portion, said medial longitudinal arch curve including:

17 an anterior slope being inclined from said upper surface of said
18 medial longitudinal arch curve toward said forefoot portion of said
19 orthosis;

20 a posterior slope being inclined from said upper surface of said
21 medial longitudinal arch curve toward said heel portion of said
22 orthosis; and

23 a medial slope being inclined from said crown portion of said
24 upper surface of said medial longitudinal arch curve toward said
25 lateral side of said orthosis; and
26 said anterior slope having an anterior base of a first thickness, said posterior

slope having a posterior base of a second thickness, said crown of said medial slope having a third thickness along said upper surface of said medial longitudinal arch curve, said medial side of said medial longitudinal arch curve being disposed in an arched curve along a length dimension of said medial side;

whereby said medial longitudinal arch curve having said anterior base, said crown portion, and said posterior base being tensioned during each foot-strike by force being transferred by the foot of the user from said heel portion and onto said medial longitudinal arch curve of said orthosis, thereby increasing the tension along said medial longitudinal arch curve without significantly decreasing the height of the arch curve, with said crown portion of said medial longitudinal arch curve flexibly rebounded to an unweighted position by force being transferred by the foot of the user from said medial longitudinal arch curve and onto said forefoot portion of said orthosis during each foot-strike by the user while wearing said orthosis; and

a means for tensioning said medial longitudinal arch curve connectable between an underside portion of said anterior slope and an underside portion of said posterior slope, said means for tensioning having a means for adjusting being manipulated by a user for adjustment of a length of said means for tensioning between a neutral length, a decreased length, and an extended length between said anterior slope and said posterior slope,

whereby when the neutral length of said means for tensioning is reduced to the

47 decreased length by the user adjustment of said means for adjusting, the tension along
48 said medial longitudinal arch curve is increased thereby the stiffness of said arch curve
49 increases from when said means for tensioning is at the neutral length, and each slope of
50 said anterior slope and said posterior slope is increased, and when the neutral length of
51 said means for tensioning is increased to the extended length by the user adjustment of
52 said means for adjusting, the tension along said medial longitudinal arch curve is
53 decreased, and each slope of said anterior slope and said posterior slope is decreased.

1 14. The foot support orthosis of Claim 13 wherein said first thickness of said
2 anterior base of said anterior slope is substantially equal to said second thickness of said
3 posterior base of said posterior slope, said third thickness of said medial slope and said
4 crown being less than the first and second thickness.

1 15. The foot support orthosis of Claim 13 wherein said first thickness of said
2 anterior base of said anterior slope is less than said second thickness of said posterior
3 base of said posterior slope, and said third thickness of said medial slope and said crown
4 being less than the first and second thickness.

1 16. The foot support orthosis of Claim 13 wherein said means for tensioning
2 including:

3 an anterior bracket being L-shaped, said anterior bracket having a distal
4 portion being connected under said anterior slope proximal to said medial side, said
5 anterior bracket having a proximal portion extended downwardly from said anterior
6 slope;

7 a posterior bracket being L-shaped, said posterior bracket having a distal
8 portion being connected under said posterior slope proximal to said medial side, said
9 posterior bracket having a proximal portion extended downwardly from said posterior
10 slope;

11 an anterior linkage aligned with said anterior bracket, said anterior linkage
12 having a distal end pivotably connected with said proximal portion of said anterior
13 bracket, said anterior linkage having a proximal end disposed underneath said crown
14 portion of said medial longitudinal arch curve;

15 a posterior linkage aligned with said posterior bracket, said posterior linkage
16 having a distal end pivotably connected with said proximal portion of said posterior
17 bracket, said posterior linkage having a proximal end disposed underneath said crown
18 portion of said medial longitudinal arch curve; and

19 said means for adjusting the neutral length between said distal end of said
20 anterior linkage and said distal end of said posterior linkage, said means for adjusting
21 having opposed ends being disposed to accept therein respectively said proximal ends of
22 said anterior linkage and said proximal linkage, said means for adjusting being

manipulated by the user;

whereby said anterior linkage and said posterior linkage are retracted into respective opposed ends of said means for adjusting, the length between said respective distal ends is shortened, each of said anterior and posterior linkages engage said each respective proximal portions of said anterior bracket and said posterior bracket, thereby each respective anterior and posterior brackets pivot respectively inwardly, thereby pulling said underside of said anterior slope and said posterior slope toward each other and increasing the tension along said medial longitudinal arch curve; and

whereby when each of said anterior linkage and said posterior linkage is extended from said means for tensioning by manipulation of said means for adjusting, the length between said respective distal ends is lengthened, thereby each distal end extends against said respective proximal portions of said anterior bracket and said posterior bracket which pivot against the underside of said anterior slope and said posterior slope, thereby pushing said underside of said anterior slope and said posterior slope apart and reducing the tension of said medial longitudinal arch curve.

17. The foot support orthosis of Claim 13 wherein said means for tensioning including:

an anterior bracket connectable to said anterior base, said anterior bracket having a distal portion being connected under said anterior base proximal to said medial

5 side, said anterior bracket having a proximal portion extended toward said posterior base;

6 a posterior bracket connectable to said posterior base, said posterior bracket
7 having a distal portion being connected under said posterior base proximal to said medial
8 side, said posterior bracket having a proximal portion extended toward said anterior base;

9 an anterior linkage aligned with said anterior bracket, said anterior linkage
10 having a distal end pivotably connected with said proximal portion of said anterior
11 bracket, said anterior linkage having a proximal end disposed underneath said crown
12 portion of said medial longitudinal arch curve;

13 a posterior linkage aligned with said posterior bracket, said posterior linkage
14 having a distal end pivotably connected with said proximal portion of said posterior
15 bracket, said posterior linkage having a proximal end disposed underneath said crown
16 portion of said medial longitudinal arch curve; and

17 said means for adjusting the neutral length between said distal end of said
18 anterior linkage and said distal end of said posterior linkage, said means for adjusting
19 having opposed rod ends being disposed to connect in an anterior swiveling connection to
20 said proximal end of said anterior linkage and in a posterior swiveling connection to said
21 proximal end of said proximal linkage, said means for adjusting being manipulated by the
22 user to retract or extend each of said opposed rod ends;

23 whereby when said opposed rod ends are retracted into respective opposed
24 ends of said means for adjusting, the length is shortened between said respective distal

25 ends of said anterior and posterior linkages, each of said anterior and posterior linkages
26 engage said respective proximal portions of said anterior and posterior brackets, thereby
27 each respective anterior and posterior brackets retract respectively toward said means for
28 adjusting, thereby pulling said underside of said anterior base and said posterior base
29 toward each other and increasing the tension along said medial longitudinal arch curve;

30 whereby when said opposed rod ends are extended into respective opposed
31 ends of said means for adjusting, the length is lengthened between said respective distal
32 ends of said anterior and posterior linkages, each of said anterior and posterior linkages
33 engage said respective proximal portions of said anterior and posterior brackets, thereby
34 each respective anterior and posterior brackets retract respectively away from said means
35 for adjusting, thereby pushing said underside of said anterior base and said posterior base
36 away from each other and reducing the tension of said medial longitudinal arch curve.

1 18. A method of supporting an arch curve of a foot of a user for treating
2 inflammation in the user's foot , the inflammation proximate the arch curve of the foot and
3 related to heel spurs, plantar fasciitis, arch pain, tendinitis, and/or metatarsalgia in the
4 foot, each foot of the user being supported by a supporting surface within respective foot
5 support enclosures, comprising the steps of:

6 providing an arch support orthosis including an adjustable medial longitudinal
7 arch curve being adjustable in slope and tension along said arch curve, said arch support

8 orthosis being sized and shaped for removably fitting underneath the arch curve of the
9 user's foot;

10 adjusting a tensioning means having a means for adjusting connected to an
11 underside of an anterior slope and a posterior slope of said medial longitudinal arch
12 curve, said adjusting step providing a first tension along said medial longitudinal arch
13 curve;

14 inserting said arch support orthosis underneath the foot of the user and upon
15 the supporting surface of the foot support enclosure;

16 bearing force from the foot of the user onto said medial longitudinal arch
17 curve of said arch support orthosis during each foot-strike by the foot of the user;

18 tensioning said medial longitudinal arch curve during each foot-strike, said
19 tensioning means limiting said medial longitudinal arch curve from being compressed in
20 height thereby supporting the arch curve of the user's foot during each foot-strike;

21 readjusting said means for adjusting to a second tension thereby reducing
22 tension along said adjustable medial longitudinal arch curve, whereby the user's arch
23 curve is continuously supported by said adjustable medial longitudinal arch curve; and

24 selecting a preferred angle of the anterior slope and a preferred angle of the
25 posterior slope, and maintaining the tension along the medial longitudinal arch curve by
26 shortening or lengthening the length of the tensioning means by manipulating said means
27 for adjusting.

1 19. The method of supporting of Claim 18, further comprising the steps of:
2 readjusting at periodic time increments the angle of the anterior slope, the
3 angle of the posterior slope, and the height of the medial longitudinal arch curve by
4 shortening or lengthening the length of the tensioning means by user manipulating of the
5 tensioning means;
6 removing and re-inserting said arch brace in the shoe, boot, or sandal of the
7 preference of the user; and
8 providing user adjustable height support, user adjustable angle of the anterior
9 slope, and user adjustable angle of the posterior slope when said removing and re-
10 inserting step is repeated;
11 whereby said adjusting step and said readjusting steps reduce the inflammation
12 in the foot and strengthen the arch curve of the foot of the user, and said removing and re-
13 inserting steps provide adjustable tension of the arch curve, anterior slope support, and
14 posterior slope support for the arch curve of the foot of the user for each shoe enclosure
15 worn by preference of the user.